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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,596	12/31/2003	John A. Colgrove	VRT0105US	8594
60429	7590	05/01/2006	EXAMINER	
CSA LLP 4807 SPICEWOOD SPRINGS RD. BLDG. 4, SUITE 201 AUSTIN, TX 78759			FARROKH, HASHEM	
			ART UNIT	PAPER NUMBER
			2187	

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/750,596

Applicant(s)

COLGROVE ET AL.

Examiner

Hashem Farrokh

Art Unit

2187

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,7,8,14-16,19,20,22,23,27,28,32 and 33 is/are rejected.
- 7) ☒ Claim(s) 2,3,5,6,9-13,17,18,21,24-26 and 29-31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/3/04,10/6/05</u> | 6) <input type="checkbox"/> Other: _____ |

The instant application having application No. 10/750,596 has a total of 33 claims pending in the application; there are 4 independent claims and 29 dependent claims, all of which are ready for examination by the examiner.

INFORMATION CONCERNING CLAIMS:

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. *Claim 27 is not limited to tangible embodiments. In view of applicants' disclosure, specification page 20, paragraph 781 the medium is not limited to tangible embodiments, instead being defined as including both tangible embodimentss (e.g., hard disk drive) and intangible embodiments (e.g., electronic signals). As such, the claim is not limited to statutory subject matter and is therefore non-statutory.*

The applicant can overcome this rejection by amending claim 27 to replace the computer readable medium with computer storage readable medium .

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section

351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 7, 14-16, 22-23, 27-28, and 32-33 rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Publication No. 2005/0071588 A1 to Spear et al. (hereinafter Spear).

2. *In regard to claim 1 Spear teaches:*

"A method (e.g., see paragraph 9 in page 2) comprising: performing a set of operations on a first data store (e.g., see paragraph 26 in page 3), wherein each operation of the set of operations on the first data store performs at least one of producing modified data from data in the first data store, and changing a configuration of the first data store (e.g., see paragraph 24 in page 2), and the performing the set of operations occurs during copying of selected data in the first data store to a second data store;" (e.g., see paragraph 33 in page 4). *For example point-in-time or snapshot operation is changing the configuration of data (see paragraph 10 in page 3 of instant specification). Spear teaches that during copying any write or update (e.g., operations) to a storage controller recorded in a bitmap (see Fig. 2). The bitmap will be copied to the remote storage controller.*

"and causing the set of operations to be performed on the second data store (e.g., see paragraph 11 in page 2), wherein if the set of operations produces the modified data and a portion of the modified data is not included in the selected data copied to the second data store (e.g., see paragraph 33 in page 4), the second data store comprises a copy of the portion of the modified data after the set of operations is

performed on the second data store." (e.g., see paragraphs 33-34 in page 4). *For example the bitmap records the indication of all data writes or updates (e.g., to the primary or master storage controller) during the copying operation that have not yet copied to remote storage controller. The remote or slave storage controller uses the bitmap for updating the its corresponding portion of data (e.g., tracks) and thus maintain the storage systems consistency.*

3. *In regard to claim 7 Spear teaches:*

"wherein if at a first point in time during the performing the set of operations, a first operation of the set of operations is performed on the first data store, and the first data store comprises first data when the first operation is performed on the first data store;" (e.g., see paragraph 41 in page 5).

"then at a second point in time, when the first operation is performed on the second data store, the second data store comprises a copy of the first data." (e.g., see paragraph 43 in page 5; step 143 in Fig. 5).

4. *In regard to claim 14 Spear teaches:*

"wherein the causing the set of operations to be performed on the second data store comprises causing at least one command that performs the set of operations to be executed on the second data store." (e.g., see paragraph 13 in page 2). *For example the Slave controller receives a command from master controller and updates the data structure and data and send message back that the operations is completed.*

5. *In regard to claim 15 Spear teaches:*

“wherein the selected data comprises first data modified as a result of a write operation.” (e.g., see **paragraph 5 in page 1**). *For example a write to update the selected data represents the data modified recited in the claim.*

6. *In regard to claim 16 Spear teaches:*

“wherein the set of operations does not include the write operation.” (e.g., see **paragraph 42 in page 5; Fig. 8**).

7. *In regard to claim 22 Spear teaches:*

“A system (e.g., see **paragraph 9 in page 2**) comprising: performing means for performing a set of operations on a first data store (e.g., see **paragraph 26 in page 3**), wherein each operation of the set of operations on the first data store performs at least one of producing modified data from first data in the first data store, and changing a configuration of the first data store (e.g., see **paragraph 24 in page 2**), and the performing the set of operations occurs during copying of selected data in the first data store to a second data store;” (e.g., see **paragraph 33 in page 4**).

“and causing means for causing the set of operations to be performed on the second data store (e.g., see **paragraph 11 in page 2; Fig. 6**), wherein if the set of operations produces the modified data and a portion of the modified data is not included in the selected data copied to the second data store (e.g., see **paragraph 33 in page 4**), second data in the second data store includes a copy of the portion of the modified data

after the set of operations is performed on the second data store.” (e.g., see **paragraphs 33-34 in page 4**).

8. *In regard to claims 23 and 28 Spear teaches:*

“wherein the set of operations comprises: an ordered subset of the set of operations, wherein operations in the ordered subset of operations are performed on both the first data store and the second data store in a sequential order.” (e.g., see **paragraph 5 in page 1**). *Spear discloses that time-stamp is used to perform the updated in logical sequence.*

9. *In regard to claim 27 Spear teaches:*

“A computer-readable medium (e.g., see **paragraph 49 in page 6**) comprising: performing instructions configured to perform a set of operations on a first data store (e.g., see **paragraph 26 in page 3**), wherein each operation of the set of operations on the first data store performs at least one of producing modified data from first data in the first data store (e.g., see **paragraph 33 in page 4**), and changing a configuration of the first data store (e.g., see **paragraph 24 in page 2**), and performing the set of operations occurs during copying of selected data in the first data store to a second data store;” (e.g., see **paragraph 33 in page 4**).

“and causing instructions configured to cause the set of operations to be performed on the second data store (e.g., see **paragraph 11 in page 2**), wherein if the set of operations produces the modified data and a portion of the modified data is not included in the selected data copied to the second data store (e.g., see **paragraph 33 in page**

4), second data in the second data store includes a copy of the portion of the modified data after the set of operations is performed on the second data store.” (e.g., see **paragraphs 33-34 in page 4**).

10. In regard to claim 32 Spear teaches:

“A computer system comprising: a processor for executing instructions;” (e.g., **element 402 in Fig. 11**).

“and the computer-readable medium of claim 28, wherein the computer-readable medium is coupled to the processor.” (e.g., see **paragraph 49 in page 6; paragraph 58 in page 7; element 406 in Fig. 11**). *Fig. 11 shows a diagram of computer architecture disclosed by Spear. The computer system includes the processor 402 and storage (e.g., computer readable medium) 406 which are inherently coupled.*

11. In regard to claim 33 Spear teaches:

“A method (e.g., see **paragraph 9 in page 2**) comprising: performing a set of operations on a first data store (e.g., see **paragraph 26 in page 3**), wherein each operation of the set of operations on the first data store performs at least one of producing modified data from data in the first data store, and changing a configuration of the first data store (e.g., see **paragraph 24 in page 2**), and the performing the set of operations occurs during copying of selected data in the first data store to a second data store;” (e.g., see **paragraph 33 in page 4**).

“and causing the set of operations to be performed on the second data store (e.g., see paragraph 11 in page 2), wherein first data in the first data store and second data in the second data store are consistent during the performing the set of operations on the first data store and during the causing the set of operations to be performed on the second data store.” (e.g., see paragraphs 33-34 in page 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4, 8, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spear in view of U.S. Patent No. 6,898,681 B2 to Young.

12. *In regard to claim 4 Spear teaches all limitation recited in claim 1 but does not expressly teach: “wherein one operation of the set of operations changes the configuration of the first data store by creating a first snapshot data store related to the first data store wherein a first snapshot of first data in the first data store is stored in the first snapshot data store; and the causing the set of operations to be performed on the second data store comprises causing a second snapshot data store related to the second data store to be created, wherein a second snapshot of second data in the*

second data store is stored in the second snapshot data store, and the first snapshot and the second snapshot comprise data that are the same.”

Young teaches: “wherein one operation of the set of operations changes the configuration of the first data store by creating a first snapshot data store related to the first data store wherein a first snapshot of first data in the first data store is stored in the first snapshot data store,” **(e.g., see column 4, lines 55-64; elements 6 and 8 in Fig. 1).**

“and the causing the set of operations to be performed on the second data store comprises causing a second snapshot data store related to the second data store to be created **(e.g., see column 11, lines 22-30; Fig. 10)**, wherein a second snapshot of second data in the second data store is stored in the second snapshot data store **(element 8-1 and 8-2 in Figs 9 and 11)**, and the first snapshot and the second snapshot comprise data that are the same.” **(e.g., see column 11, lines 22-30; Fig. 10)** *for creating two or more point-in-time or snapshot of data in separate shadow stores (e.g., snapshot data store).*

Disclosures by Spear and Young are analogous because both references relates to data backup in storage systems.

At the time of invention it would have been obvious to a person of ordinary skill in art to modify the storage system taught by Spear to include the multiple point-in-time copying taught by Young.

The motivation for combination as taught by column 11, lines 48-62 of Young is to enable a user to view the data at any point in time and restore to data at any point in time if desired without any need to an offline backup. A previous point-in-time thus can be accesses quickly and easily.

Therefore, it would have been obvious to combine disclosures by Young with Spear to obtain the invention as specified in the claim.

13. *In regard to claim 8 Young teaches:*

"wherein if at a first point in time during the performing the set of operations, the first data store comprises first data, then at a second point in time, when the second data store represents the first data store at the first point in time, the second data store comprises a copy of the first data." (e.g., column 4, lines 55-64; Fig. 10). For example a write or overwrite operation (e.g., on a first data) is performed, a point-in-time copy of data is stored in the shadow store. The shadow stores represent the master store at the point in time.

14. *In regard to claim 19 Young teaches:*

"wherein the second data store further comprises a copy of the selected data after copying the selected data to the second data store." (e.g., column 11, lines 23-30; Fig. 10). For example the shadow store 8-2 comprised the copy or point-in-time of selected data.

15. *In regard to claim 20 Young teaches:*

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“upon failure of a primary node associated with the first data storage (e.g., column 1, line 35), identifying a portion of the selected data in the first data store (e.g., column 12, lines 11-13), wherein the portion has not been copied to the second data store (e.g., column 6, lines 16-18), and causing only the portion to be copied to the second data store such that the first data and the second data are the same.” (e.g., column 1, lines 55-64). *Young teaches the shadow stores are used to store the point-in-time copy of data. Bitmaps are maintained to indicate the data blocks (e.g., portion of data) that have been copied and data that need to be copied.*

ALLOWABLE SUBJECT MATTER

Claims 2-3, 5-6, 9-13, 17-18, 21, 24-26, and 29-31 are objected to as being dependent upon rejected based claims, but would be allowable if rewritten in correct and independent form including all of the limitations of the base claim and any intervening claims.

1. *The primary reason for allowance of claim 2 in instant application is the combination with the inclusion of the following limitations: causing the set of operations to be performed on the second data store comprises causing a corresponding portion of second data in the second data store to be restored from fourth data in a fourth data store, wherein the portion of the first data and the portion of the second data are the same after the restoring the portion of the*

first data and after the causing the corresponding portion of the second data to be restored.

2. The primary reason for allowance of claim 3 in instant application is the combination with the inclusion of the following limitations: causing the set of operations to be performed on the second data store comprises causing second data in the second data store to be synchronized with fourth data in a fourth data store corresponding to the third data store, wherein the first data and the second data are the same after the synchronizing the first data and after the causing the second data to be synchronized.

3. The primary reason for allowance of claims 5 and 6 in instant application is the combination with the inclusion of the following limitations: establishing a replication relationship between the first snapshot data store and the second snapshot data store after the second snapshot data store is created, wherein the replication relationship causes subsequently modified data in the first snapshot data store to be included in selected snapshot data copied to the second snapshot data store.

4. The primary reason for allowance of claim 9 in instant application is the combination with the inclusion of the following limitations: wherein the set of operations comprises: an ordered subset of the set of operations, wherein operations in the ordered subset of operations are performed on both the first data store and the second data store in a sequential order.

5. The primary reason for allowance of claims 10 and 11 in instant application is the combination with the inclusion of the following limitations: causing the set of

operations to be performed on the second data store comprises causing the producing the copy of the modified data to occur at the specified point in the sequential order on the second data store.

6. *The primary reason for allowance of claim 12 in instant application is the combination with the inclusion of the following limitations: **wherein the subset of ordered operations comprises all operations in the set of operations.***

7. *The primary reason for allowance of claim 13 in instant application is the combination with the inclusion of the following limitations: **the specified point in the sequential order is between a first respective point in the sequential order and a second respective point in the sequential order, the first respective point is adjacent in the sequential order to the second respective point, and each operation in the unordered subset can be performed concurrently with respect to other operations in the unordered subset.***

8. *The primary reason for allowance of claims 17 and 18 in instant application is the combination with the inclusion of the following limitations: **wherein the selected data further comprise a portion of a snapshot of first data stored in the first data store, and the portion of the snapshot is modified as a result of a second write operation.***

8. *The primary reason for allowance of claim 21 in instant application is the combination with the inclusion of the following limitations: **identifying second modified data in the first data storage, wherein the second modified data were produced***

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before the set of operations was performed on the first data storage and after the set of operations was performed on the second data storage, and the second modified data are not included in the selected data copied to the second data store.

9. *The primary reason for allowance of claims 24-25 and 29-30 in instant application is the combination with the inclusion of the following limitations: second causing means for causing the producing the copy of the modified data to occur at a specified point in the sequential order on the second data store, wherein producing the modified data occurs at the specified point in the sequential order on the first data store, the specified point is between a first respective point in the sequential order and a second respective point in the sequential order, the first respective point and the second respective point are adjacent in the sequential order.*

10. *The primary reason for allowance of claims 26 and 31 in instant application is the combination with the inclusion of the following limitations: the specified point in the sequential order is between a first respective point in the sequential order and a second respective point in the sequential order, the first respective point is adjacent in the sequential order to the second respective point, and each operation in the unordered subset can be performed concurrently with respect to other operations in the unordered subset.*

: IMPORTANT NOTE :

*If the applicant should choose to rewrite the independent claims to include the limitations recited in either one of the claims, the applicant is encouraged to **amend the title of the invention** such that it is descriptive of the invention as claimed as required by sec. 606.01 of the MPEP. Furthermore, the **summary of invention** and the **abstract** should be amended to bring them into harmony with the allowed claims as required by paragraph 2 of sec. 1302.01 of the MPEP.*

As allowable subject matter has been indicated, applicant's response must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 C.F.R. § 1.111(b) and § 707.07(a) of the M.P.E.P.

Conclusion

The prior art made of record and not relied upon are as follows:

- 1. U. S. Patent Publication No. 2003/0051111 A1 to Nakano et al. describes Remote copy control method, storage sub-system with the method, and large area data storage system using them.*
- 2. U. S. Patent No. 5,592,618 to Micka et al. describes Remote copy secondary data copy validation-audit function.*
- 3. U. S. Patent No. 7,020,743 B2 to Lee et al. describes Atomic remote memory operations in cache mirroring storage systems.*

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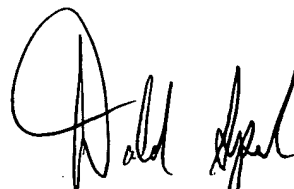
*Any inquiry concerning this communication should be directed to Hashem Farrokh whose telephone number is (571) 272-4193. The examiner can normally be reached Monday-Friday from **8:00 AM to 5:00 PM**.*

If attempt to reach the above noted Examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Donald A Sparks, can be reached on (571) 272-4201. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBS) at 866-217-9197 (toll-free).

HF

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2006-04-19



DONALD SPARKS
SUPERVISORY PATENT EXAMINER